USAWC STRATEGY RESEARCH PROJECT

UNITED STATES POLICY ON WEAPONS IN SPACE

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ABSTRACT

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The Space Commission Report identifies the United States' ever-growing reliance on space and space technology both militarily and economically. It outlines the vulnerabilities of our systems and warns we must be prepared to prevent a "Space Pearl Harbor." Does this concern dictate the next logical step is to begin the process of space weaponization? United States government space policy is under review and may alter the current "wait and see" posture regarding the development and deployment of space based weapons. Is it in our national interest to pursue weapons in space? Is space weaponization inevitable? This paper will examine the issue in three parts. First it will define the issue and examine the background of the debate including the political and legal environment. The second part will analyze what might lead the United States to pursue a policy of space weaponization and examine the question of inevitability. The analysis will also examine the benefits verses the expense and vulnerabilities and consider the impact on a range of potential adversaries. Finally, the paper proposes recommendations for a 21st century space policy that offers an alternate approach to meeting national security while actively seeking to prevent the weaponization of space.

UNITED STATES POLICY ON WEAPONS IN SPACE

Space is a distinct medium for military activities. Air Force Doctrine states, "Space is a medium of warfare like air, land, and sea…that must be protected and controlled..."[1] Already, significant military activity takes place in space. Nations use space assets in performing communication, weather prediction, navigation and reconnaissance missions to enhance many aspects of military operations including indirectly guiding weapons to targets. Although space is militarized, it is not yet weaponized. The question of whether policy should pursue placing actual kinetic or energy based weapons capable of directly engaging targets, is one that must be based on sound judgment and take into account the ramifications. Many people think international agreements or treaties prohibit weaponization of space. In fact, legal agreements limiting weapons in space only address weapons of mass destruction. There is significant political pressure from governments, international institutions, the scientific community and non-governmental organizations opposed to the idea of space weapons. Before analyzing the case for a policy direction, it is first important to define space weapons and the period under review, examine the political environment surrounding weapons in space, understand existing legal constraints and review current United States policy.

Background

What is and what is not a space weapon?[2] For the purpose of this paper, I define a space weapon as any device or system placed in earth orbit, deep space or on a celestial body (such as the moon) capable of directly engaging, defeating or destroying a target (kinetically or with energy). What this definition does not include are weapons that use space as a means to get from one point in the land/air battle space to another or originate from the land/air medium without the intent to return. Therefore, this definition excludes Intercontinental Ballistic Missiles (ICBMs), ground based ICBM interceptor missiles, ground/air launched Anti Satellite Weapons, and ground based energy weapons (such as lasers). By using the phrase "directly engaging, defeating or destroying a target," the definition also excludes those systems that only serve as a component or enhancement to another direct delivery system or platform, for example, the role of the Global Positioning System (GPS) in a delivery of a Joint Direct Attack Monition by an aircraft. Beyond these few caveats, I chose not to attempt an exhaustive list of what is and is not included in this definition. The point of this paper is to guide national policy; therefore, this definition is sufficient to proceed with the discussion.

It is also necessary to limit the scope of this policy discussion with respect to the time frame. The question is not will there ever be weapons in space, but should we develop, design

and deploy weapons in a time span that a current national security policy could reasonably govern. This is not an exercise in *Star Trek* science fiction debating "phasers" on the USS Enterprise. It is about current and near-term capabilities and space systems that we could reasonably expect to execute over the next three to five decades.

Most of the international community is on record in favor of preserving space as a weapons free sanctuary. On November 29, 2001, the United Nations General Assembly voted 156-0 to establish the basis for a treaty to ban space-based weapons.[3] In 2000, a similar resolution to prevent an arms race in space passed 163-0.[4] Though these were non-binding resolutions, of the major powers, only the United States and Israel abstained from these votes. In May 2005, Russia announced it was drafting another United Nations resolution to ensure that outer space is free of weapons.[5] Numerous scientific groups call for peaceful space exploration and the continuation of the current weapons free sanctuary. Many peace organizations are actively opposed to weapons in space and routinely protest outside space related installations. Given the opposition to space weapons, the United States should consider the potential political ramifications as part of its deliberation. Opposition to the Kyoto Treaty on the Environment, opposition to banning land mines, opposition to the International Criminal Court and the decision to go to war with Iraq are a few of many policies that have helped created an international image of the United States as unilateralist. A recent poll by the Pew Research Center "found that a majority in most countries say the United States doesn't take the interests of other countries into account when making international policy decisions."[6] The poll also found a majority felt the need for another nation to balance the United States militarily.[7] The questions of international political influence, international image, and the possibility of creating a new and costly arms race are all factors the United States must consider before deciding on a policy to weaponize space.

There are actually few legal limitations governing the weaponization of space. *The Limited Test Ban Treaty of 1963* prohibits nuclear weapon tests or any other nuclear explosion in outer space.[8] *The Outer Space Treaty of 1967* prohibits weapons of mass destruction in space, on the moon or other celestial bodies for any military purpose.[9] Together, these treaties only limit a space based weapon if it consists of, in any way, a weapon of mass destruction or otherwise has the purpose of detonating a nuclear devise in space, perhaps for example to generate an electromagnetic pulse. A third treaty, *the Anti-Ballistic Missile (ABM) Treaty of 1972* prohibits the development, testing, or deployment of space based components of an anti-ballistic missile system.[10] However, in December 2001, President George W. Bush formally notified the Russian government that the United States was withdrawing from the treaty. With this resignation, the treaty is no longer legally binding on the United States or Russia. Several

other treaties and conventions including bilateral arms control agreements have a tertiary affect as far as they prohibit the United States and Russia from interfering with satellites used to monitor treaty compliance. Though these agreements would not prohibit the development and deployment of space weapons, they could affect the legality of using the weapons against the other nation's space systems. Finally, the Space Liability Convention of 1972 assigns to the launching state responsibility for damage caused to another state by a space object.[11] This could prove a nuisance to any nation employing space weapons but like the ABM treaty, a nation can withdraw with one year notice.

Current United States government policy on space is guided by the September 19, 1996 National Space Policy document of the National Science and Technology Council.[12] Regarding space weapons, it takes a "wait and see" approach to space weapons. The policy does not specifically prevent or limit weaponization of space though it does not specifically direct it. It does direct the Department of Defense to "develop, operate and maintain space control capabilities to ensure freedom of action in space and, if directed, deny such freedom of action to adversaries."[13] That one statement carefully leaves the door open to the possibility of weapons in space while indicating that further guidance is required to take action against an adversary. This policy, developed under the Clinton administration, has not been superseded or withdrawn by the Bush administration. In 2002, President Bush ordered a review of space policy after a commission, chaired by Donald Rumsfeld, concluded that the United States could face a "space Pearl Harbor."[14] To date, the White House has not published the new policy. Some believe the delay is due to an ongoing internal debate about this very issue. John Logsdon, director of the Space Policy Institute at George Washington University, stated that although the review is almost complete, the section on Space Security is holding up the final document.[15] Will the eventual Bush administration policy shift away from the "wait and see" approach to a directive policy of actively pursuing space-based weapons for space control and application of force?

Analysis

This analysis will examine several questions in the debate about pursuing a policy of placing weapons in space. Something must drive a United States national policy decision to pursue weapons in space. First, I will examine the possible driving factors for weapons in space. Second, there is a tone to the much of the current government material on the subject, such as the space commission report, doctrine, current policy and various other literature that weapons in space are inevitable.[16] In books, articles and studies on the subject, the inevitability of weaponization is usually discussed. What is the case for inevitability and is it sound? Third,

space systems are one of many national defense capabilities that are competing for finite national resources (human, fiscal, intellectual and temporal). Are space weapons the right way to invest our limited resources? Finally, are space weapons the best approach to counter our current or potential adversaries? What responses might it illicit from Russia, China, and rogue states? What, if anything, will it add to the fight against terrorism or other situations?

The Drive For Space Weapons

In the book, *Space Weapons – Earth Wars*, published by The Rand Corporation, the authors examine the question of how the United States might come to acquire space weapons and develop several conclusions for deliberate acquisition.[17] In this section, I will explore these rationales for acquiring space weapons.

The first case for deliberate acquisition of space weapons is in response to an adversary's threat that cannot be deterred by other means, such as the United States current conventional or nuclear deterrent capability.[18] For this choice to make strategic sense, the United States must strike a balance between these new undeterred adversaries while not upsetting the existing balance with more capable historical adversaries such as Russia.[19] The strategy must also add to the existing deterrence capability of the United States or else we can only assume the United States seeks impunity from attack for the purpose of possible military action against the lesser adversary. For deterrence to work, an adversary must believe that enough of its forces would survive a first strike to inflict sufficient damage on the United States in order to make a first strike inconceivable. The key to deterrence is that both sides are taking a defensive posture. Neither side will strike first because they know the other side is capable of a counter strike that will inflict unacceptable damage. If one side disrupts this "balance" through a combination of space or other weapons, then by definition, deterrence does not exist. Either the adversary will seek to rebalance the equation by improving their capabilities (a defensive posture) or they will seek alternate means to strike first (an offensive posture). If they choose the former, we can conclude they merely hope to prevent aggression from the United States. If they choose the latter, then deterrence is irrelevant because that adversary wants to strike at the United States regardless of our capabilities to respond overwhelmingly. In this case, space weapons add nothing to deterrence capability while potentially they could alter the deterrence equation elsewhere. The undeterred adversary can seek ways to strike that we cannot counter or that are unknown to us, many less complex than missiles and nuclear weapons.

The second case for deliberate acquisition is in response to acquisition of space weapons by another nation.[20] Another nation, whether friend, ally or adversary, may choose to acquire

space weapons for any or all of the reasons facing the United States.[21] The United States would have to consider the decision to respond in kind, do nothing, or pressure the other nation to give up its space weapons. The nation in question, the capabilities of the weapons and the extent to which they threaten the United States, would all be factors in selecting a course of action. This also assumes that either the United States is actively pursuing space weapons and has not yet made a decision to go forward with deployment or that the United States has failed in its leadership to prevent space weapons (as proposed later in this paper).

The third case for deliberate acquisition is in cooperation with other nations.[22] This is more likely a case for a space based missile defensive capability in concert with friends and allies. It would be necessary to take into account the impact on the deterrence equations mentioned earlier.[23] Alternatively, it might be a means for the United States to exert influence and control over another nation independently pursuing space weapons.[24]

Finally, the United States could make a unilateral decision to acquire space weapons even absent a compelling threat.[25] This scenario relies on the argument that space weapons are inevitable and will be vital to meet national security requirements by maintaining a technological edge over future peer competitors while simultaneously offering greater flexibility in global strike capabilities.[26] Popular literature helps fuel the case for inevitability by making space weapons seem to be on the cusp of reality. As recently as November 1995, *Popular Science* ran a cover story with the bold headline, "The New War in Space."[27] This type of rhetoric aside, the case for inevitability is not as strong as some might assume. Will policy makers believe strongly enough in a perceived promise of enhanced national security to alter our current "wait and see" course to one that provides specific direction to pursue space weapons?

The Inevitability of Space Weapons

Space weapons are not inevitable. The decision to place weapons in space is a choice, not certainty. Those who argue otherwise point to human nature, historical analogies, economic vulnerability and military necessity to make their case that space weapons are unavoidable.[28] Each of these arguments has merit but none hold up to scrutiny to make a strong case for the inevitability of space weapons.

The human nature argument states that people are warlike and the nation states they run will do whatever is in their national interest, which naturally includes taking weapons wherever they go, including space.[29] The implication is that humans cannot control the tendency to develop and deploy any weapon that could give them an actual or perceived military advantage

over an adversary. It should be noted however, that for the last forty-five years space has in fact been free from weapons.[30] Humans and nations have resisted the temptation so far. Other weapons, such as chemical and biological weapons and land mines have also fallen into disrepute and though not yet eliminated, they are certainly out of favor. [31]

Some point to historical analogies of humans venturing onto the high seas, into the air and under the oceans and that in each case, we weaponized those mediums. Why then should we expect it to be any different for space? General Howell M. Estes III, former commander of United States Space Command put the argument like this,

> If we examine the evolutionary development of the aircraft, we see uncanny parallels to the current evolution of spacecraft… The potential of aircraft was not recognized immediately. Their initial use was confined to observation… Until one day the full advantage of applying force from the air was realized and the rest is history. So too with the business of space… (military) space operations, like the land, sea and air operations that evolved before them will expand (into) the budding new mission already included into the charter of US Space Command…as they become more and more critical to our national security interests.[32]

On the surface, the logic of historical analogies seems sound but further analysis indicates there is some significant dissimilarity as well.

In the case of Sea Power, militarization followed because the sea transported people and commerce and served as a means for armies to invade enemy lands.[33] Unlike the sea, commerce and people do not transit through space, only information does. While information is vital in today's global economy, it is not solely dependent on space as a medium of transit. The idea of invasion from space is only an issue in Hollywood. As for militarization under the sea, it is important to note that weapons were the first and, for a long time, the only use for subsurface vessels. Their purpose, tied to the surface, was denying the use of the seas for commerce and transport.

The case for Air Power seems more promising as argued by Gen Estes above, but further examination finds some significant flaws as well. One significant difference between air and space is that air is territorial and space is not.[34] Though the two mediums evolved similarly initially, they have not continued to do so.[35] Weaponization of the air took only ten years from the development of the first aircraft. As stated earlier, it has been forty-five years now without the weaponization of space. The development of observation aircraft and bombers necessitated the development of fighters to defend against them; therefore, weaponization of the air was inevitable for the defense of a nation's territory. [36] In contrast, observation and reconnaissance from space has had a stabilizing effect internationally. The freedom of the

United States and Russia to see what the other side was doing became so important that it was codified in several arms control treaties. This necessity, in part, led both sides to unilaterally abandoned anti-satellite programs that could threaten the other's reconnaissance satellites, something without precedence in Air Power history. [37]

The third argument for weapons in space is that there is a threat to the ever-growing United States economic dependence on space. This presumably makes space assets a target for a potential enemy and requires we defend those assets with space weapons. The questions to consider here are many. How great is the cost to defend those assets with space weapons verses the cost of the assets themselves? Most military space systems are many times more expensive than the civilian satellites they would presumably protect. How likely are civilian space assets to be targeted by an adversary in any case? Most civilian systems or systems with significant economic value operate in very high earth orbit (11,000 nm to 24,000 nm) making them more difficult to target than a military reconnaissance satellite in low earth orbit (350 nm). Finally, why would an enemy want to threaten such systems? Presumably, the reason would be to hurt the United States economically or coerce behavior.[38] Since most economic space assets have terrestrial alternatives like fiber optic communications or terrestrial navigation aids, it would seem space assets would be an unlikely target given the technical capabilities necessary to damage them decisively. Precision would be difficult to achieve. In a highly globalized world economy, damaging space infrastructure would very likely affect more than just the United States economy. Finally, numerous earthbound targets exist that would cause comparable or greater impact at significantly less cost and effort to an adversary.

The argument for military necessity states that the military advantages of space weapons to the United States and potential adversaries will soon be so great that it is in the national security interest to pursue them.[39] Space weapons will "defend friendly satellites… attack enemy space weapons and other satellites that perform important military functions, shoot down long-range ballistic missiles, and conduct attacks against enemy air and surface forces."[40] The basis of this argument is that regardless of what the United States chooses to do, other nations will certainly develop space weapons over time. The United States relies heavily on the force enhancement aspect of military space systems including communications, navigation, warning and reconnaissance. We cannot afford to allow another space power to cripple the advantage these systems offer. This is similar to the economic argument above, but recognizes that our military space systems are far more indispensable.[41] The counter to this argument is that it is not the development and deployment of space weapons that is the best solution to this vulnerability. Diversification of capabilities to reduce reliance on space assets is a less costly,

more achievable solution. Examples include the use of many more, but much smaller, satellites, cheaper and less complex launch vehicles, near-space balloons to provide communications over a theater, improved inertial navigation systems to reduce or eliminate reliance on space navigation aids and the proliferation of small-unmanned aerial vehicles for reconnaissance. As for space-to-earth weapons, the United States already possesses considerable ability to project force around the world.[42] Space-to-earth weapons might offer some advantage in quick strike capability over capabilities we have today, but is the expense worth it? Quick "target of opportunity" strikes in the Iraq war were unable to take out Saddam Hussein. Attacks against terrorist leaders in Pakistan were equally unsuccessful. Even strikes from space will require accurate intelligence support on the ground. In other words, a sniper on the ground with a $500 rifle could perform the same mission as a $500 million satellite in space that would still require the person on the ground to provide the target information. Any weapon is only as good as the targeting intelligence and our record in that area is somewhat suspect.

Capability, Affordability and Vulnerability

Are space weapons the best way for the United States to spend limited human, fiscal and intellectual national resources? To analyze this question we must examine three areas of concern. Would space weapons improve global strike and global reach capabilities? Are space weapons reasonably affordable? What are the vulnerabilities of space weapons?

For space weapons to be of national security value they must offer the prospect of enhancing the ability to engage targets quickly, anywhere on the globe. However, as we have seen in recent years, the ability to strike targets is only part of the equation. We must also be able to project forces to achieve national objectives (i.e., boots on the ground). As with Air Power, Space Power has no ability to take ground and hold it. Precision strikes, whether from aircraft or from space, are only as reliable as the intelligence on the target. With freedom of action in the skies over Iraq in the opening act of Operation IRAQI FREEDOM, the USAF was quickly able to guide bombs onto targets suspected of harboring Saddam Hussein. The strikes failed to kill the Iraqi leader and served only to highlight the ineffectiveness of this type of surgical strike from the air while creating international outrage over using 2,000 lb bombs to kill one man regardless of the collateral damage inflicted. It took months and thousands of troops in Iraq to find Saddam Hussein hiding in a hole underground. Space weapons would not likely enhance the effort to hunt down and kill rogue state leaders or terrorists. Conceivably, space to ground kinetic weapons could provide a more agile global strike capability than Air Power alone, especially in areas of the world where forces are not pre-positioned.[43] A full constellation of

space weapons would be necessary to achieve this goal. A typical low earth polar-orbiting satellite only passes over the same location on the earth's surface once every 12 hours. To ensure agile global strike capability, many satellites would be necessary. The Global Positioning System requires a minimum of 24 satellites at medium earth orbit (11,000 nautical miles) to achieve global navigational coverage. To achieve global communication coverage at a low earth orbit, the Iridium satellite constellation employs 66 satellites. How many satellites (and at what cost) would be necessary to achieve a truly agile global strike capability? Assuming good intelligence on the target and satellites overhead, there would still be delays for the command and control apparatus to obtain approval to strike a target. Would the president grant a combatant commander authority to strike a target in any nation without taking time to consider political ramifications? Time is another enemy of a quick strike success. Space weapons could end up an expensive scheme to kill "targets of opportunities" with results no more effective than an aircraft armed with guided weapons.

Given the likely cost of space weapons, they are a poor replacement for existing conventional strike capability to engaging targets in a nation with which the United States was engaged in hostilities. "Shock and Awe" from space would be a far more expensive tactic than using existing conventional capabilities and much harder to sustain. That leaves missile defense and counter space as the other possible national security enhancement for space weapons. As previously discussed, space based missile defense requires a careful calculation of the effects it has on the balance of deterrence across the spectrum of potential adversaries.

The case for counter space requires thoughtful consideration. Conceivably, the United States could pursue weapons such as micro-satellites designed to disable or destroy an adversary's space systems. These satellites could be concealed and parked near potential targets and employed only if necessary to take away an adversary's. The peril of this is two fold. First is the potential of creating space debris that interferes with everyone's peaceful or military use of space. The second reason, and perhaps of greater concern, was articulated well by John Pike, director the think tank Globalsecurity.org, when he said, "People who live in glass houses should not organize rock-throwing contests."[44] The United States has more satellites in orbit than any other country and has greater civilian and military dependence on space than any other nation.

Space systems are extremely expensive and, often, contractors overestimate capabilities and underestimate cost. One needs to look no further than the Space Based Infrared System (SBIRS) and the Evolved Expendable Launch Vehicle (EELV) to see where we would be headed with the prospect of developing robust space weapon capabilities. Originally conceived,

SBIRs was to be a vastly more capable replacement of the Defense Support Program (DSP) early warning satellite system providing missile warning and battlespace characterization.[45] It would include constellations of space-based assets in various orbits along with a common ground segment for operations. The development was broken into two phases named SBIRs-high and SBIRS-low.[46] SBIRS-high was for the high earth orbit portion of the program and in 1996 the Air Force awarded the original contract for $2.16 Billion.[47] In March 2005, Acting Air Force Secretary Peter Teets estimated the current cost at $12 Billion.[48] The program has repeatedly breached the "Nunn-McCurdy" 25 percent program acquisition unit cost growth limit requiring the Air Force to meet certain recertification criteria for the program to continue.[49] Costs aside, the original launch date of the first SBIRS-high satellites has repeatedly been delayed. The EELV has seen a similar explosion in costs. Originally billed as the follow-on to existing satellite launch boosters with the goal of reducing the government's total launch cost by half, it was targeted to cost $18.8 billion.[50] Today, Congressional reports peg the projected cost just shy of $32 billion.[51] This is not intended to question the need for either SBIRS or EELV, but only to point out that projected costs and capabilities of space systems present a real and significant budgetary risk. At a time when the Air Force is proposing early retirement for all F-117 fighters, half its B-52 fleet and elimination of U-2 reconnaissance assets in an effort to boost spending for the new F-22 fighter jets, it is hard to imagine one can find value in the need for exotic space weapons.[52]

Space is a fragile weapons platform. For defense, space is as static as an earth bound fortification.[53] It takes a great amount of energy to achieve a particular orbit and it is both time and energy consuming to change an orbit.[54] As a result, satellite systems are typically deployed in constellations requiring large numbers and increased expense to achieve global coverage. Like a weakness in a fortification, this allows an adversary to concentrate on one point and potentially overwhelm the system.[55] Space systems reside in stable, observable and predictable orbits. The laws of orbital mechanics govern their motion. A satellite's presence is observable through the electro-optical spectrum. Therefore, an adversary will likely know the precise current and future location of any satellite system. Command, control and logistics are expensive and complex. Command and control nodes provide terrestrial targets as necessary to the overall systems function as the space based segment. The cost per pound to place objects in orbit is very high and launches occur from a few static terrestrial locations. Command and control relies on terrestrial networks subject to jamming or destruction. Maintenance, refueling and rearming (if necessary) are impractical or, at best, orders of magnitude more difficult than for aircraft.

The Potential Adversaries

Are space weapons necessary to counter adversaries? The environment in which the United States might choose to develop and deploy space-based weapons is complex. In making the decision, policy makers must take into account the reaction and response of potential adversaries with a wide array of capabilities with the ultimate goal of increasing national security. At one end of the spectrum lies Russia, with its large and diverse, if somewhat decaying, strategic arsenal and significant space capabilities. One-step below is China, with less capable and stationary strategic forces, but growing space capabilities. At the bottom tier are the so-called rogue states such as North Korea and Iran, with limited, but growing missile and nuclear forces and virtually non-existent space capabilities. Finally, the United States must also consider the impact on the Global War on Terrorism. This section examines the dynamic of space weapons on these potential or existing adversaries.

Russia is clearly concerned about the potential pursuit of space weapons by the United States. As previously mentioned, Russia is leading the charge in the United Nations to prevent the weaponization of space. Despite their concern, Russia has perhaps the least to worry about if the United States develops and deploys these weapons.[56] It is possible that even with a small space based defensive combined with ground-based defenses that are currently under development and deployment, it would not upset the strategic deterrence balance between the United States and Russia.[57] Undoubtedly, however, they would be compelled to respond. Flush with revenues from crude oil sales, Russia has embarked on a program to upgrade its strategic deterrence capabilities. In a direct response to American ground based missile defense activities, Russia is developing maneuverable re-entry vehicles for its nuclear arsenal designed to foil these ground-based systems.[58] This is clearly a defensive posture designed to preserve the perceived balance of deterrence. In reaction to a space-based component of missile defense, Russia would evaluate the threat and again, likely respond in some manner. How that response would manifest itself is unknown. Russia could respond in kind with their own space-based systems, they could develop anti-satellite capabilities to attack opposing space systems or they could further increase the capabilities of their strategic forces in an effort to overwhelm the system. Alternatively, Russia or any other potential adversary, might publicly link the use of space-based weapons to the first use of nuclear weapons in the same way that the United States and others have lumped chemical, biological and nuclear weapons into the category of Weapons of Mass Destruction (WMD).[59] If that categorization took root internationally, it could have the effect of significantly raising the stakes for using the weapons rendering a space weapons as politically impotent as our stockpile of chemical weapons.

Like Russia, China would need to evaluate the threat space weapons pose to their national security and respond accordingly. With a less mobile, more static strategic nuclear force, China may have less assurance than Russia that their forces could survive a first strike. If they perceive retaliatory forces could not penetrate a combined space and ground based missile to inflict enough damage to provide deterrent, space based defense may drive them to rapidly advance the capabilities of their strategic forces, increasing numbers, modernizing re-entry systems and improving mobility. Regarding the most likely point of future conflict with China, the issue of Taiwan, any offensive or defensive space system that improves the United States' ability to project force in the western Pacific Ocean will be seen as a threat. As a growing space power, China is perhaps in the best position to pose a threat to American space dominance. Regardless of our actions, China may pursue means to attack or defeat our space systems (weaponized or otherwise), but by developing space weapons first, the United States surely invites that conclusion.

So-called rogue states such as Iran and North Korea present perhaps the most compelling reason to develop a space based missile defense. The problem here is that if we assume a future Iran or North Korea with nuclear-armed ballistic missiles, then conclude we need space-based defensive capabilities to counter that threat, we must also assume that our existing deterrence capability is ineffective (as discussed previously). If this is the case, then we are dealing with irrational state actors. It is difficult to conceive of a state so intent on striking a blow against the United States or its allies that it is willing to launch ballistic missiles from its territory for that purpose. The response would be swift and total retaliation. A more plausible scenario for the irrational state actor to strike at the United States is concealing their strike to the maximum extent possibly including possibly transferring WMD to terrorist organizations. Space weapons provide no added security in this scenario.

The last category to examine is the impact space weapons could have in the Global War on Terrorism. The most likely use for space weapons to contribute to the war on terror is by expanding and improving global strike and global reach capabilities. As previously discussed, however, there is minimal, if any, benefit in this area. There are numerous cases (one previously cited) where we have missed high value targets despite having quick strike capabilities readily available. The United States has proved quite adept at gaining the necessary access around the globe to combat terrorism. The funding necessary to develop and deploy space to ground weapons would be better-used improving effectiveness in other areas of the fight and reducing the vulnerability of existing space based enablers.

Recommendation

The Bush Administration's new space policy, when published, may do nothing to change the current "wait and see" approach on weaponization of space or it may provide the direction previously lacking to proceed down that path. There is a third and better alternative. I believe the United States government should implement space policy with the goal of actively preventing the weaponization of space while aggressively funding programs that reduce the vulnerabilities of existing commercial and military space systems. First, the United States should take a leadership role on the issue and actively move to prevent the deployment and use of space weapons. Second, we must reduce our military's reliance on space based force enhancement through diversification of systems, capabilities and technologies aimed at decreasing the threat posed by a "space Pearl Harbor."

The first step is leadership in setting the intended standard. As the world's only superpower, and the one nation in the best position to weaponize space, by not doing so we may pave the way to ensure it never happens.[60] Our current relative dominance in space gives the United States unique credibility in leading an international effort to limit space weapons, as the nation with presumably the most to give up. It would be easy for Peru to give up space weapons. Since they have no near-term prospects for a space program, they really are not giving up anything tangible. By renouncing space weapons, the United States is giving up something real and tangible. This can have the effect of setting a very high international value on preserving space as a weapons free sanctuary. Initially, the United States should announce a policy of unilateral constraint in the development and deployment of weapons in space.[61] From this position of strength, we should pursue and shape comprehensive and verifiable international conventions that limit weapons in space. The strength comes from a combination of our technological dominance in space and our leadership position in the world. As discussed, space weapons are a choice. If the United States, through international leadership, places great value on a space sanctuary, it increases the international pressure for others to follow suit. It also raises the political ramifications of any nation's violation of the sanctuary or unwillingness to participate in the conventions. If, on the other hand, the United States acts as the pioneer for space weapons, not only do we pay the political cost of breaking the sanctuary of space, but we also reduce the cost (political and economic) of entry to those who follow.[62] Restraint increases the pressure for others to restrain as well. Failing restraint, should another space capable country be unwilling to sign and comply with the conventions and later develop space weapons, it would greatly enhance the political environment for the United States to counter any threat including a greater likelihood of having partners, political and otherwise, in the process.[63]

The second part of the policy deals with reducing the vulnerabilities of current space systems and our sole reliance on them for some aspects of force enhancement. There are many examples. Alternate platforms such as near space balloons or unmanned aerial vehicles positioned over a theater of operations can provide battlespace characterization, communication, reconnaissance and other capabilities currently provided by space systems. Innovative and advanced technologies can improved the capabilities of inertial navigation systems for vehicles and munitions, thus reducing reliance on the Global Positioning System. Smaller satellites, with redundant capabilities deployed in larger more distributed constellations, can reduce the vulnerability of single point failures. The specific examples are less important than the goal of finding ways to diversify the overall force enhancement capabilities currently provided by space systems.

Conclusion

Military use of space is necessary, and protecting the peaceful use of space is vital to the United States' national security. The argument that the military uses space assets to enhance its capabilities on the land, air and sea and the fact that those assets are vulnerable does not make a compelling case for weaponization of space. Space systems are too fragile to serve as an effective weapons platform. Offensive counter-space is less complex than defensive counter-space and the United States has the most to lose from a shooting war in earth orbit. Deterrence, not space-base missile defense, is the best approach to counter the threat of strategic ballistic missiles across the spectrum of potential adversaries. Security gained by these systems against less capable adversaries, which would be limited at best, is less than the adverse affects they would have on the balance of deterrence elsewhere. Finally, the United States is unlikely to enhance its global strike and global reach capabilities at a reasonably affordable cost or with results more effective than current conventional capabilities provide. The best course of action for a new space policy is reducing our vulnerability by decreasing our reliance on space assets and preserving space as a weapons free sanctuary.

Endnotes

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[11] Bob Preston et al., *Space Weapons Earth Wars* (Santa Monica, CA: RAND, 2002), 19.

[12] National Science and Technology Council, *Fact Sheet: National Space Policy* (Washington, D.C.; The White House, 19 September 1996) available from http://www.ostp.gov/ NSTC/html/fs/fs-5.html; Internet; accessed 20 February 2006.

[13] Ibid.

[14] Demetri Sevastopulo, “Concern over Keeping the Final Frontier Demilitarized Space”, Financial Times (13 September 2005): 4 [database on-line]; available from Lexis-Nexis; accessed 20 February 2006.

[15] Ibid., 5.

[16] Preston, 74.

[17] Chapter five of the book Space Weapons Earth Wars discusses both deliberate and incidental reasons why the United States might aquire space weapons. Since this paper deals with policy, I have chose to limit the analysis to only the cases for deliberate acquisition.

[18] Preston, 68.

[19] Ibid., 69.

[20] Ibid., 70.

[21] Ibid., 71.

[22] Ibid., 73.

[23] Ibid., 73.

[24] Ibid., 73.

[25] Ibid., 73.

[26] Ibid., 74.

[27] Dawn Stover, "Battlefield Space," *Popular Science*, November 2005, 51.

[28] Karl P. Mueller, "Is the Weaponization of Space Inevitable?," 27 March 2002; available from http://www.isanet.org/noarchive/mueller.html; Internet; accessed 20 February 2006.

[29] Ibid.

[30] Ibid.

[31] Ibid.

[32] Gen. Howell M. Estes III, Commander, Air Force Space Command, speech to the Air Force Association Annual Symposium, Los Angeles, 18 October 1996, taken from Karl P. Mueller's paper in endnote #8.

[33] Mueller.

[34] Ibid.

[35] Ibid.

[36] Ibid.

[37] Ibid.

[38] Ibid.

[39] Ibid.

[40] Ibid.

[41] Ibid.

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[45] U.S. Air Force Fact Sheet, “Space Based Infrared System,” January 2003; available from http://space.au.af.mil/factsheets/sbirs.doc; Internet; accessed 20 February 2006.

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[59] Preston, 81.

[60] Mueller.

[61] Ibid.

[62] Ibid.

[63] Preston, 71.